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A new dawn for the naming of fungi: impacts of decisions made in Melbourne in July 2011 on the future publication and regulation of fungal names

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Abstract

A personal synopsis of the decisions made at the Nomenclature Section meeting of the International Botanical Congress in Melbourne in July 2011 is provided, with an emphasis on those which will affect the working practices of, or will otherwise be of interest to, mycologists. The topics covered include the re-naming of the *Code*, the acceptance of English as an alternative to Latin for validating diagnoses, conditions for permitting electronic publication of names, mandatory deposit of key nomenclatural information in a recognized repository for the valid publication of fungal names, the discontinuance of dual nomenclature for pleomorphic fungi, clarification of the typification of sanctioned names, and acceptability of names originally published under the zoological code. Collectively, these changes are the most fundamental to have been enacted at a single Congress since the 1950s, and herald the dawn of a new era in the practice of fungal nomenclature.

Key words

Amsterdam Declaration; Code of Nomenclature; electronic publication; MycoBank; nomenclature; pleomorphic fungi; registration; sanctioned names; taxonomy.

Introduction

The internationally agreed rules that regulate how fungi are named are examined and revised at each International Botanical Congress, the last published being those re-

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sulting from the Vienna Congress in 2005 (McNeill et al. 2006). These Congresses are now held every six years, and the subsequent one in Melbourne in July 2011 was faced with a staggering 338 proposals made to modify the Vienna edition of the *International Code of Botanical Nomenclature* (McNeill and Turland 2011). This was the largest number to have confronted any Congress since that held in Paris in 1954. The issues that the Melbourne Congress had to address included topics as fundamental as the language required for the valid publication of names, the acceptability of electronic publication, and the unease amongst mycologists on how decisions were made.

It may seem weird to 21st century biological science students that fungi are embraced in a *Code* with just "botanical" in the title. However, the actual remit was all organisms traditionally studied in departments of botany in museums and universities, regardless of their current classification in the kingdoms of *Life* – even all bacteria were covered until the Montreal Congress of 1959. Some rules are, nevertheless, applicable only to particular systematic groups or categories, and since the Brussels Congress of 1910 there have been special regulations which only apply to the names of fungi. Foremost amongst these have been issues related to: (1) the date at which the nomenclature of fungi was deemed to commence; (2) the status of living cultures as name-bearing types; and (3) the separate naming of morphs in pleomorphic fungi. Any proposed changes in the rules relating to particular groups or categories (e.g. fossils) are discussed by a series of permanent committees, the members of which are elected at the end of each Congress and serve to the next. In the case of the fungi, the permanent committee is now called the Nomenclature Committee for Fungi (NCF). A valuable synopsis of how the current system operates is given by McNeill and Greuter (1986), while Nicolson (1991) provides an authoritative historical account of the development of the *Code*.

During recent decades, and especially in the 2000s, many mycologists had become increasingly dissatisfied with various aspects of the rules concerning the naming of fungi. This was reflected in sessions and debates at various national, regional, and international meetings, culminating in three Nomenclature Sessions held as a part of the IXth International Mycological Congress (IMC9) in Edinburgh in August 2010. During those sessions, various already published proposals for change were discussed, and in addition all delegates to the Congress were invited to complete a questionnaire to canvass their views on key issues and possible ways forward; a report of those Sessions and the results of the questionnaires are provided by Norvell et al. (2010).

The decisions taken at the Melbourne Congress were so fundamental, with respect to both "botanical" nomenclature as a whole, and especially with specific topics that concerned fungi, that these need to be widely promulgated. A formal report of those decisions is provided by McNeill et al. (2011), and more detailed information of those pertaining to fungi is presented by Norvell (2011). Those reports include the new approved wordings, though they may still undergo some fine-tuning by the Editorial Committee appointed by the Congress. The Editorial Committee is to meet in London in December 2011, and it is anticipated that the finalized *Melbourne Code* will be printed in mid-2012. However, changes effected at an International Botanical

Congress come into effect immediately they are approved by the Plenary Session of the Congress unless specifically limited by date. It is, therefore, essential that all mycologists involved in the naming of fungi are made aware of both the changes made that come into force before the *Code* is printed, and those that are to be anticipated from 1 January 2013.

The purpose of the present article is to alert mycologists as a whole to the fundamental changes made at the Melbourne Congress, a package which represents a paradigm shift in how fungi are now to be named, and to indicate the implications of those changes for working practices. It is not, however, to be considered authoritative, and the final version of the *Melbourne Code* should be consulted as soon as it becomes available.

Principle changes and their impacts

Name of the Code changed

Mycologists, tired of appearing subservient to botanists, and for mycology to be treated as a part of botany (Hawksworth 1997, Minter 2011) made proposals for the name of the *Code* to be changed to reflect their independence (Hawksworth et al. 2009). This view had been supported at IMC9 (Norvell et al. 2010), and the Melbourne Congress agreed that the new *Code* should be called the *International Code of Nomenclature for algae, fungi, and plants.* The lower case letters used for the words "algae", "fungi", and "plants" are employed to make clear these terms are being used in a colloquial sense, for instance the inclusion of cyanobacteria in algae, and chromistan fungal analogues, slime moulds, and lichens in "fungi".

The Congress further agreed that editorial changes should be made throughout the text so that it referred to "organisms" governed by the *Code*, and no longer used "plants" where fungi were included in the concept.

Governance of fungal nomenclature to be considered

Proposals to transfer decision-making on issues concerning fungi from International Botanical to International Mycological Congresses (Hawksworth et al. 2009), and which had been strongly supported at IMC9 (Norvell et al. 2009) were not accepted. However, a Subcommittee on governance of the *Code* with respect to fungi was established under a Special Committee mandated with examining how the Nomenclature Section operated. That Committee (and Subcommittee) are to report to the next International Botanical Congress in 2017. In view of this move, mycologists will now have to consider whether to put on hold the question of the need for an independent *Code* for fungi (see below) pending that report. The matter needs to be placed on the agenda for Nomenclature Sessions to be convened during IMC10 in 2014.

English or Latin validating diagnoses permitted

The issue of whether to discontinue the requirement for validating diagnoses or descriptions in Latin has been raised at almost all International Botanical Congresses since this requirement was first introduced in 1935. The Melbourne Congress was presented with proposals from botanists to allow any language, as is the practice in zoology, and some alternative ones, including one by mycologists to require Latin or English for fungi (Norvell et al. 2010, Demoulin 2010). There was a precedent in that the alternative of Latin or English was already allowed for fossils in the Vienna Code. The Congress not only supported the mycological proposal, but also decided that it should apply not just to fungi but to *all* organisms treated under the *Code*. Further, so enthusiastic was the meeting, that it was agreed that this provision should operate from 1 January 2012, not 1 January 2013. Consequently, mycologists no longer need to struggle with coining a few sentences of pseudo-Latin when describing new fungi. However, in consequence, I personally see value in presenting both a diagnosis (i.e. a short statement of how the fungus differs from others) and a separate description (i.e. a detailed account of all the features of the fungus) when describing a new fungus. If a diagnosis were in Latin or English, the description could then continue to be in any language of the author's choice. A diagnosis has been required for the introduction of new scientific names in zoology since 1930 (International Commission on Zoological Nomenclature 1999: Art. 13), and the practice has much to commend it.

Electronic publication permitted (but with restrictions)

The issue of the acceptability of works published only electronically as a vehicle for the effective publication of scientific names has been the subject of a series of Special Committees established by successive International Botanical Congresses since that held in Tokyo in 1993, and is also an issue currently being actively debated by zoologists (Michel et al. 2009). With the increasing proliferation of new electronic journals, and established journals also increasingly being available in both electronic and hard-copy forms, the issue was becoming increasingly urgent. A Special Committee established by the Vienna Congress in 2005, considered the matter in depth (Chapman et al. 2010) and prepared detailed proposals for consideration by the Melbourne Congress (Special Committee on Electronic Publication 2010). The Melbourne Congress accepted many of these proposals, and the pertinent revised texts and guidelines as to best practice are given by Knapp et al. (2011). The key points agreed were that from 1 January 2012, works published in electronic form on the worldwide web in an unchangeable Portable Document Format (PDF) are to be treated as effectively published, *provided that* they have either an International Standard Serial Number (ISSN) or an International Standard Book Number (ISBN). However, non-final versions made available online in advance of a definitive version (e.g. accepted papers as yet unedited or proof-read) are not treated as effectively published. Where both electronic and hard-copy versions of a work

are made available, the date of effective publication of both is treated as being the same. Guidance as to how copies can be differentiated is included in Knapp et al. (2011).

It is important to appreciate that the new provisions do not mean that material placed on or available through websites and lacking ISSN or ISBN numbers constitutes effective publication. Authors considering submitting to an electronic journal, should therefore first check that it has an ISSN number. It is also recommended that electronic-only works containing new taxa are drawn to the attention of appropriate indexing centres, and mycologists should endeavour to do that until the requirement for the prior deposit of key nomenclatural information becomes mandatory on 1 January 2013.

Deposit of key nomenclatural information made mandatory for fungi

The concept of some form of obligatory registration of newly proposed scientific names for fungi goes back to the 1950s (Ainsworth and Ciferri 1955). Following the establishment of a Special Committee on Registration at the Berlin Congress in 1987, and a series of subsequent workshops, a provision to make this a requirement for all groups of organisms covered by the *Code* was accepted by the Tokyo Congress in 1993 – but then rejected at the St Louis Congress in 1999 despite successful trials (Greuter 2009). The development of the worldwide web, however, has made it possible to devise much-improved systems from those that were possible in the 1980s and early 1990s. Following informal discussions during the 2002 International Mycological Congress (IMC7) in Oslo, in 2004 the CBS-KNAW Fungal Biodiversity Centre in Utrecht established an online system for the deposit of key information on newly proposed names of fungi – MycoBank. This voluntary system proved popular with mycologists, and also with mycological journals, as a way of rapidly expediting information on nomenclatural novelties. Since 2007 Mycobank has operated under the auspices of the International Mycological Association (IMA) which now has long-term responsibility fot its continuance.

Formal proposals to make the deposit of key nomenclatural information in a recognized online repository a mandatory requirement for valid publication of new scientific names in fungi at all taxonomic ranks (including new combinations and replacement names) were then developed (Hawksworth et al. 2010). Those proposals were overwhelming endorsed by the International Mycological Congress in Edinburgh later in the same year (Norvell et al. 2010). The Melbourne Congress approved the formal proposals with some "friendly" amendments, mainly based on suggestions for avoiding unnecessary inflation of names in the repositories (Morris et al. 2011). In addition a recommendation that information on choices made between competing names or honomyms, spelling or gender also be deposited (Gams 2010) was approved.

The new requirement comes into force on 1 January 2013, after which date scientific names of fungi which are published without a unique identifier by a recognized repository will not be considered as validly published; i.e. they will not exist for nomenclatural purposes and need not be considered when determining the correct name

for a taxon under the *Code*. While the requirement is only for information required by the rules of the *Code*, such as the diagnosis and information as to the nomenclatural type or a basionym, as appropriate, there is no objection to databases also including additional information and the prospects are enormously exciting (Lumbsch et al. 2011).

The responsibility of appointing online depositaries was given to the Nomenclature Committee for Fungi, which will need to advise mycologists as to which are approved. No single repository was specified in the proposals, thus leaving the possibilities open in the rapidly-moving electronic age. At present it is deposit in MycoBank which is now required by almost all mycological journals.

Mycologists should note that the prudent way to proceed is to make the online deposit of the required data, and obtain the numerical identifier, only *after* their work has been accepted for publication. This is to ensure that the information included agrees in every detail that which will appear in the publication which establishes the name. This will not affect the priority of the name as the effective date of publication will be that of the electronic or hard-copy publication and not the date information is deposited. The lodging of a name and associated details in a repository such as MycoBank will not in itself establish a name.

This exciting move means that, for the first time ever, mycologists will have immediate and free online access to the key nomenclatural and diagnostic information on newly proposed fungal names. It also means that it is the authors of new names which will now have the responsibility of ensuring that names they propose are incorporated into international indexing repositories.

Dual nomenclature of pleomorphic fungi discontinued

The concept of permitting separate names for anamorphs of fungi with a pleomorphic life-cycle has been an issue of debate since the phenomenon was recognized in the mid-19th century. This was even before the first international rules for "botanical" nomenclature were issued in 1867 (Weresub and Pirozynski 1979, Taylor 2011). Special provisions are to be found in the earliest *Codes*, which were then modified several times, and often substantially (Weresub and Pirozynski 1979). The rules became increasingly complex, and by the mid-1970s they were being interpreted in different ways by different mycologists – even ones working on the same genus. Following intensive discussions under the auspices of the International Mycological Association (IMA), drastic changes were made at the Sydney Congress in 1981 to clarify and simplify the procedures – and the now familiar terms anamorph, teleomorph, and holomorph entered general use. An unfortunate effect of the simplification was that many name changes had to be made as a consequence, including ones of some well-known and economically important species; at that date, the conservation of species names was not allowed under the *Code*.

Unforeseen in the 1970s, when the 1981 provisions were crafted, was the impact of molecular systematics. A decade later, it was starting to become obvious that fungi

with no known sexual stage could confidently be placed in genera which were typified by species in which the sexual stage was known (Reynolds and Taylor 1991), and the issue of the abandonment of the dual nomenclatural system was posited (Reynolds and Taylor 1992). This possibility was debated at subsequent International Mycological Congresses, and on other occasions (e.g. Seifert et al. 2000, Seifert 2003), and the need for change was increasingly recognized. Cannon and Kirk (2000) regarded deletion as inevitable in the long-term, and further calls for deleting the provision followed (e.g. Rossman and Samuels 2005). At the International Botanical Congress in Vienna in 2005, some minor modifications were made which allowed anamorph-typified names to be epitypified by material showing the sexual stage when it was discovered, and for that name or epithet to continue to be used where there was no previously sexually-typified name available.

More importantly, the Vienna Congress established a Special Committee to investigate the issue further, but unfortunately it was unable to reach a consensus (Redhead 2010). Matters were becoming increasingly desperate as mycologists using molecular phylogenetic approaches started to ignore the provisions, or interpret them in different ways (Rossman and Seifert 2010). The view that emerged from the International Mycological Congress in Edinburgh the same year, was that mycologists, as a whole, favoured gradual progress towards a single nomenclature (Norvell et al. 2010). In the meantime, various proposals were made to improve the situation, but the situation was becoming so complex that few mycologists were likely to take the time to understand them fully and implement them correctly. In order to progress the matter, an international symposium was held in Amsterdam in April 2011, under the auspices of the International Commission on the Taxonomy of Fungi (ICTF), to explore ways to obtain a solution. If a solution could not be reached at the Melbourne Congress, the prospect was for no substantive change to be made until after the 2017 International Botanical Congress. This situation would then have become intolerable as mycologists increasingly ignore the rules.

The Amsterdam symposium prepared a declaration of principles which, it was hoped, would be accommodated in any change made to Article 59 (Hawksworth et al. 2011). In effect these amounted to the ending of dual nomenclature, but with safeguards to minimize changes in familiar names. The "Amsterdam Declaration" prompted a critical response from some other mycologists who perceived difficulties in aspects of the declaration, and wished to continue allowing dual nomenclature (Gams et al. 2011). Both these documents were made available to delegates at the Melbourne Congress. In order to ensure some resolution of the issue, proposals for three possible options were developed by Redhead, in consultation with various mycologists, for presentation at the meeting. Following extensive discussions at the Congress, the option to discontinue the dual nomenclature system was approved, but with some safeguards to limit resultant instability (Norvell 2011, McNeill et al. 2011).

After 1 January 2013, one fungus can only have one name; the system of permitting separate names to be used for anamorphs then ends. This means that all legitimate names proposed for a species, regardless of what stage they are typified by, can serve

as the correct name for that species. All names now compete on an equal footing for priority regardless of the stage represented by the name-bearing type. In order not to render names that had been introduced in the past for separate morphs as illegitimate, it was agreed that these should not be treated as superfluous alternative names in the sense of the *Code*. It was further decided that anamorph-typified names should not be taken up to displace *widely used* teleomorph-typified names until the case has been considered by the General Committee established by the Congress[1]. Recognizing that there were cases in some groups of fungi where there could be many names that might merit formal retention or rejection, a new provision was introduced. It was decided that lists of names can be submitted to the General Committee and, after due scrutiny, names accepted on those lists are to be treated as conserved over competing synonyms (and listed as Appendices to the *Code*). Lichen-forming fungi (but not lichenicolous fungi) were always excluded from the provisions permitting dual nomenclature; the new *Code* will include a paragraph to make it explicit that lichen-forming fungi are excluded from the newly accepted provisions.

Mycologists need now to work to implement this major change. In cases where a later teleomorph-typified name is not widely used, it can be anticipated that mycologists will now simply adopt the earlier anamorph-typified name. If others consider a decision inappropriate, a proposal for the conservation of the teleomorph-typified name over the earlier anamorph-typified name can be made to the Nomenclature Committee for Fungi (NCF). Although no detailed arrangements were made at the Congress, it is anticipated that, where specialist working groups on particular fungal genera or families exist, as is the case for subcommissions of the International Commission on the Taxonomy of Fungi (ICTF), draft lists of names for possible approval will be prepared by them. In my personal view, there could also be some advantage in endeavouring to have one list covering all potentially affected generic names, if mechanisms to achieve that could be put in place. In the early part of 2012, the NCF is to work closely with the ICTF and other groups where they exist (e.g. within the International Union of Microbiological Societies, IUMS) to develop processes for the preparation of lists on particular groups. Draft lists will need to be made available for comment by mycologists at large (e.g. through the IMA and ICTF web sites), and they will then require revising them in the light of comments received. Lists received by the NCF would, after due consideration by that Committee, then be forwarded to the General Committee for approval.

Where mycologists wish still to refer to anamorphs separately, the new provisions do not prohibit informal usages, such as "acremonium-state" or "acremonium-like", ideally with a small initial letter and normal not italic type as suggested by Cannon and Kirk (2000). This form of typography makes clear that the designations are not scientific names governed by the *Code*.

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[1] The General Committee is elected at each International Botanical Congress, and is responsible for receiving, considering, and approving reports from the various permanent nomenclature committees, such as the Nomenclature Committee for Fungi, for the period up to the next Congress..

Typification of sanctioned names clarified

The dates on which the nomenclature of fungi was deemed to start were changed from 1801 or 1821 to 1753 by the International Botanical Congress in Sydney in 1981. This change was made because the later-starting point system had come to be interpreted in different ways, and because of difficulties in ascertaining the first usages of already proposed names after the proscribed dates (Demoulin et al. 1981). In order to minimize the resultant name changes, the concept of "sanctioning" was introduced. Sanctioning permitted the continued use of names that had been adopted in the 1801 *Synopsis Methodica Fungorum* of Persoon, or the 1821-32 *Systema Mycologicum* of Fries over names that otherwise would have to be taken up under the normal rules of priority, homonymy, etc. However, the wording of the rule in the Sydney Code was somewhat ambiguous and, although modified slightly at the Berlin Congress in 1987, it could still be interpreted as meaning either that the typification of a sanctioned name should be made only on materials cited in the sanctioning work, or that it could be based on materials cited in the original pre-sanctioning place of publication.

Proposals to address this issue were published before the Melbourne Congress (Perry 2010, Redhead et al. 2010), but there were concerns over these. In consequence, a series of informal discussions was held in Melbourne, which involved the proposers and other concerned mycologists. Those meetings led to the formulation of a series of proposals which were adopted by the Congress (McNeill et al. 2011, Norvell 2011). The net effect of the changes made is that a name that has been sanctioned can now be lectotypified (not neotypified) by material from among the elements associated with either the original protologue of the name, the sanctioning treatment, or both. A further and welcome clarification is that in cases where in the sanctioning work elements associated with the original protologue did not include a subsequently designated type selected for the sanctioned name, the sanctioning author is considered to have introduced a later homonym that is to be retained because of its sanctioned status.

No particular date was mentioned in the adopted proposals, which means that they became operative when approved by the Melbourne Congress. They are also retroactive, and so safeguard many typifications made since the 1981 Congress which were based on material cited in the original protologue, or on material of the sanctioning author where that differed. The adoption of these clarifications is most welcome as it removes the need for many typifications made since 1981 to be revisited, something that could have had unfortunate implications for the stability of many sanctioned names.

Names of fungi first described as animals are validly published

The revelation that *Microsporidia*, a group traditionally studied by zoologists, belonged to kingdom *Fungi* posed a threat to numerous names in use in the phylum. This situation arose as, while those names had been correctly published and were available for use under the provisions of the International Code of Zoological Nomenclature, many

did not meet the requirements of the botanical *Code*. At the Vienna Congress in 2005, it was agreed that names within *Microsporidia,* and other organisms that had originally been published under the zoological code, were to be treated as validly published under the botanical *Code*. However, in accordance with the wishes of workers on these fungi, the Melbourne Congress accepted proposals made by Redhead et al. (2009) that these organisms should be excluded from governance by the botanical *Code* and continue to be covered by the zoological one, despite their phylogenetic position. It was further agreed that this principle should be adopted for other groups of organisms traditionally treated under other codes.

Explicitly indicate the physiological state of type cultures

A rule in the current *Code* allows cultures of algae and fungi to serve as name-bearing types, provided that they are "preserved in a metabolically inactive state". In practice, the physiological state of cultures designated as types is often not stated by describing authors. In order make this explicit, it is now recommended that the phrase "permanently preserved in a metabolically inactive state", or equivalent, be used when cultures are designated as types.

Names based on fossil parts loose special provisions

In recent years there have been extensive debates in the palaeobotanical community on how to revise the provisions relating to the naming of parts of fossil organisms treated under the *Code* – and which applied to fungi as well as plants. Competing sets of proposals were submitted to the Melbourne Congress. As in the case of ending the separate naming of anamorphs in pleomorphic fungi, the Congress decided to abandon the practice of separately naming parts of fossils. Consequently, names of fossils which prove to be parts of a single species will now compete with each other for priority, in the same way as occurs for names not based on fossils.

The Draft BioCode and MycoCode need to be revisited

Moves towards increased harmonization between the various codes of nomenclature were initiated in 1985. However, the prospect, in the long-term, of having a set of rules governing the future nomenclature of all organisms was developed in the early 1990s (Hawksworth 1995). This culminated in the publication of a *Draft BioCode* in 1996 which had been prepared by the IUBS[2]/IUMS International Committee on Bio-

[2] The International Union of Biological Sciences, in which the International Mycological Association represents general mycology.

nomenclature (ICB)[3]. Little progress was made in taking the initiative further as the mechanisms and resources to develop the prerequisite lists of names to be considered available were not forthcoming. The project was subsequently revived as a scientific programme of IUBS in 2009, and an updated *Draft BioCode* was prepared and released for further discussion in January 2011 (Greuter et al. 2011). That draft was the subject of a session and debate at Biosystematics 2011 (which incorporated the International Congress of Systematic and Evolutionary Biology) in Berlin in February 2011. This initiative was mentioned briefly in the final session of the Nomenclature Section meetings in Melbourne, but was not considered in any depth. A suggestion that the Section establish a Special Committee to liaise with those involved in the revision of the draft was not approved.

The possibility of having an independent code for mycology was raised and received considerable vocal support at the International Mycological Congress (IMC8) in Cairns in 2006. However, the option of renaming and revising the botanical *Code* was the one favoured at the subsequent Congress in Edinburgh in 2010 (Norvell et al. 2010). The issue was also raised at the Amsterdam symposium in April 2011 which was primarily convened to address the issue of dual nomenclature. At that symposium it was suggested that the *BioCode* model could provide a framework for the future regulation of the nomenclature of fungi (Hawksworth et al. 2011). Key to any movement in this direction, was seen as the extent to which the botanical *Code* would change to meet the needs of mycologists (Taylor 2011). In view of the major changes made at the Melbourne Congress, the issue of whether an independent MycoCode is really now required needs to be debated at the International Mycological Congress (IMC10) in Bangkok in 2014.

Discussion

I have participated in all International Botanical Congresses since that held in St Petersburg in 1975, and served on the Editorial Committee of the botanical *Code* since 1987. The progress made in adapting the rules to the needs of both user and practitioner mycologists over that period has been considerable. These have included, for example, the change in starting point, the conservation and rejection of species names, the designatation of interpretive types ("epitypes"), and allowing living metabolically inactive cultures to be nomenclatural types. The powers of the permanent Nomenclature Committees have also been enhanced over the years, so that they can now recommend rejection of any name whose adoption is regarded as disadvantageous.

Even against this background of increasing adaptation, the raft of changes effected at the Melbourne Congress in 2011, has to be seen as the dawn of a new era for botani-

[3] The IUBS/IUMS International Committee on Bionomenclature comprises representatives of the five internationally mandated organismal codes of nomenclature: botanical, cultivated plant, prokaryote, viral, and zoological; it was formally established in 1994.

cal and mycological nomenclature, truly bringing it into the modern age. The decisions made with respect to the name of the *Code,* its coverage, electronic publication, and the requirement for the deposition of key information in a recognized depositary as a requirement for the publication of fungal names, place the *Melbourne Code* ahead of what zoologists are currently endeavouring to do.

There is still much to be achieved by mycologists, especially with respect to the implementation of the consequences of the end of dual nomenclature for pleomorphic fungi, although the regulatory mechanisms are now in place. A major issue that remains is how best to designate taxa only known from molecular studies of environmental samples, and to consider whether that requires any changes in the *Code* (Hawksworth et al. 2011, Hibbett et al. 2011, Taylor 2011).

Finally, I must stress that the views and interpretations presented in this overview are personal, and that mycologists should check the decisions and verify actual wordings agreed in Melbourne for themselves, especially in the official report of the Nomenclature Section meetings (McNeill et al. 2011), and then the edited published version of the *International Code of Nomenclature for algae, fungi, and plants* when it becomes available in mid-2012.

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